CHESUNOV, V.M., kand. tekhn. nauk, dotsent; VASIL'YEV, S.S., doktor khimicheskikh nauk, prof.

Kinetics of the evaporation of the solvent mixture form a solution of nitrocellulose. Nauch. trudy MTILP no.28:75-81 '63. (MIRA 17:11)

CHESUNOV, V.M., kand. tekhn. nauk, dotsent; GERTSEV, V.V., aspirant

Gas-liquid chromatography of boric acid esters. Nauch. trudy MTILP no.29:131-132 '64. (MIRA 18:4)

1. Kafedry organicheskoy khimii, analiticheskoy i neorganicheskoy khimii Moskovskogo tekhnologicheskogo instituta legkoy promyshlennosti.

CHESUNOV, V.M., kand. tekhn. nauk, dotsent

Gas chromatography of viscous polymer solutions. Nauch. trudy MTILP no.29L133-135 '64. (MIRA 18:4)

1. Kafedra neorganicheskoy i analiticheskoy khimii Moskovskogo tekhnolcgicheskogo instituta legkoy promyshlennosti.

BARAMBOYM, N. K., doktor khimicheskikh nauk, prof.; CHESUNOVA, A. G., inzh.

Method of increasing the strength of thread joints of parts made with porous polymer materials. Izv. vys. ucheb. zav.; tekh. leg. prom. no.4:95-102 '62. (MIRA 15:10)

1. Moskovskiy tekhnologicheskiy institut legkoy promyshlennosti. Rekomendovana kafedroy fizicheskoy i kolloidnoy khimii.

(Boots and shoes, Rubber)

SAMYLIN, P.; CHETAYEV, A.

Mechanizing the production of catgut. Mias.ind.SSSR 31 no.1: 33-34 '60. (MIRA 13:5)

1. Kazanskiy ketgutnyy zavod.
(Kazan--Catgut)

CHETAYEV, D.N

Source: Mathematical Review,

CHETAYEV, D.N

CHETAYEV, D. N.

USSR/Physics - Waveguides 21 Jul 51

"Problem of Eliminating the Reflections in Waveguides of Variable Cross Section," B. L. Rozhdestvenskiy, D. N. Chetayev

"Dok Ak Nauk SSSR" Vol LXXIX, No 3, pp 427-430

Considers a rectangular waveguide with variable cross section and proposes a constructive (design) method for eliminating reflections caused by the inhomogeneities of its form. Shows that if a waveguide is filled with an inhomogeneous medium whose

211T90

characteristics are connected in a definite manner with the inhomogeneity of its form, then reflections of waves of the type H_{n0} can be completely eliminated. Submitted by Acad B. A. Vvedenskiy 16 May 51.

211T90

CHETAYEV, D. N.

Geomagnetism

Dissertation: "Study of Unsettled System of Electromagnetic Fields in Nonhomogenous Media." Cand Phys-Math Sci, Geophysics Inst, Department of Physicomathematical Sciences, Acad Sci USSR, Oct-Dec 1953. (Vestnik Akademii Nauk, Moscow, Mar 54).

SO: SUM 213, 20 Sep 1954

Cetaev, D. N. On a point source of direct current in a ... half-space ... 1955 ... (Russian)

... distribution ...

$$(\ z\ r) = \int_0^\infty J_0(rt)\ u(z\ t)dt$$

... the equation

$$\frac{\partial u}{\partial z} \ldots \sigma(z),\ u = \ldots$$

... integrated.

E. Kogbetliantz (New York, N.Y.)

CHETAYEV, D.N.

J-2

USSR / Acoustics. Sound Vibrations and Waves

Abs Jour : Ref Zhur - Fizika, No 5, 1957, No 12668

Author : Chetayev, D.N.

Inst : Geophysical Institute, Academy of Sciences, USSR

Title : Effect of Velocity of Subsonic Stream on the Radiation Impedance of a Piston with Infinite Flange.

Orig Pub : Akust. zh., 1956, 2, No 3, 302-309

Abstract : It is shown that the calculation of the acoustic impedance
of a piston with an infinite flange, radiating from a mo-
ving medium, can be reduced to the calculation of double
integrals. An analysis is made of the active and reactive
portion of the radiation impedance of a rectangular piston.
The results of the calculations are given in tables. The

Card : 1/2

CHETAYEV, D.N.

One theorem of electric prospecting. Izv.AN SSSR.Ser.geofiz. no.4: 473-474 Ap '56. (MLRA 9:8)

1. Akademiya nauk SSSR, Geofizicheskiy institut.
(Prospecting--Geophysical methods)

CHETAYEV, D.N.

Theory of pulse soundings based on the application of direct current in an ungrounded loop. Izv.AN SSSR.Ser.geofiz. no.5: 595-598 My '56. (MLRA 9:8)

1. Akademiya nauk SSSR, Geofizicheskiy institut.
(Prospecting--Geophysical methods)
(Electric currents--Grounding)

Chetayev D.N.

60-32-1/3

AUTHOR: Chetayev, D. N.

TITLE: Computing Nonstabilized Electromagnetic Fields in Nonhomogeneous Media (K raschetu neustanovivshikhsya elektromagnitnykh poley v neodnorodnykh sredakh)

PERIODICAL: Trudy Geofizicheskogo instituta Akademii nauk SSSR 1956, Nr 32, pp 3-25 (USSR)

ABSTRACT: The author discusses the work of A. N. Tikhonov, who gives a general method of solving problems in the propagation of nonstabilized electromagnetic fields in bedded conductive media. The calculation of a nonstabilized field induced by a current pulse of arbitrary form and with a cable of any shape is reduced to a determination of a stabilized field when direct current is switched into an element of the cable. Tikhonov and

Card 1/2

49-5-14/18

AUTHOR: Chetayev, D. N.

TITLE: On a converse problem in the theory of resistivity prospecting. (Odna obratnaya zadacha teorii elektrorazvedki).

PERIODICAL: "Izvestiya Akademii Nauk, Seriya Geofizicheskaya" (Bulletin of the Ac.Sc., Geophysics Series), 1957, No.5, pp. 677-679 (U.S.S.R.)

ABSTRACT: The effect of topography on resistivity prospecting was treated by various authors (1-6) for a number of special cases. In the present paper a converse problem is considered, namely, given the field function it is desired to determine the topography. It is shown that the associated mathematical problem is essentially the same as the main converse problem of aerodynamics (8-10) i.e. the problem of the form of the profile of a wing if the magnitude of the velocity is known at each point of the latter as a function of the length of arc. The difference between them consists in that in the hydrodynamic case one deals with a closed contour. The problem for a contour extending to infinity with a regular function W(z) was considered by Nuzhin (11). The present problem is solved by an essentially analogous method. Using the expressions obtained in the present paper it is possible to compute the

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49-5-14/18

On a converse problem in the theory of resistivity prospecting. (Cont.)

relief of the surface in the case of a homogeneous medium. It is possible that a comparison of this with the real relief could be useful in the interpretation of the data obtained in resistivity prospecting.
There are 11 references, 8 of which are Slavic.

SUBMITTED: November 26, 1956.

ASSOCIATION: Ac.Sc. U.S.S.R. Institute of Physics of the Earth. (Akademiya Nauk SSSR Institut Fiziki Zemli).

AVAILABLE: Library of Congress

Card 2/2

Chetayev, D.N.

AUTHOR: Chetayev, D. N. 49-6-11/21

TITLE: Analytical interpretation of data from resistivity prospecting on complex relief using the method of the natural field. (Analiticheskaya interpretatsiya dannykh pri elektrorazvedke metodom yestestvennogo polya v usloviyakh slozhnogo rel'yefa).

PERIODICAL: "Izvestiya Akademii Nauk, Seriya Geofizicheskaya" (Bulletin of the Ac.Sc., Geophysics Series), 1957, No.6, pp. 794-799 (U.S.S.R.)

ABSTRACT: The following problem is considered: given the values of electric potential measured over a curvilinear surface, the position of an ore deposit lying under the surface has to be determined. As a first approximation the deposit giving rise to the field is considered to be in effect a dipole and a medium is taken as uniform and isotropic. The method of solution of the inverse problem of aerodynamics (Tumashev et al., Refs.8 and 9) is employed in the solution of the present problem. The solution is formulated in such a way that given an anomaly with a well-defined bearing, it is possible to determine the position of the ore deposit and the direction of its polarisation. The moment of the effective dipole is also calculated. The method

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49-6-11/21

Analytical interpretation of data from resistivity prospecting on complex relief using the method of the natural field.(Cont.)

provides an automatic check on its own applicability. There are 2 figures and 11 references, all of which are Slavic.

SUBMITTED: January 22, 1957.

ASSOCIATION: Institute of Physics of the Earth, Ac.Sc., U.S.S.R. (Akademiya Nauk SSSR Institut Fiziki Zemli).

AVAILABLE: Library of Congress

Card 2/2

Chetayev, D.N.

49-58-3-8/19

AUTHOR: Chetayev, D.N.

TITLE: On Determining Thermal Coefficients by Means of the Method of Linear Instantaneous Source (K opredeleniyu termicheskikh koeffitsiyentov metodom lineynogo mgnovennogo istochnika)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, 1958, Nr 3, pp 363-364 (USSR)

ABSTRACT: A method is described of calculation of the thermal constants on the basis of measured results for the case of a line source for which the calculation formulae cannot be expressed in elementary functions. For eliminating the basic disadvantage of the method of the instantaneous source, a source is investigated which acts uniformly during a certain time interval τ_0 . It is assumed that the influence of the sources themselves on the heat propagation can be disregarded as well as the influence of the finite lengths of the heat source. Formulae derived and the respective relations are plotted in the graph (Fig.1). By means of such graphs, which need be plotted only once, it is possible to determine the coefficient of heat conductivity, k , and the coefficient of temperature conductivity, a , by means of simple equations, using experimental data. There is 1

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49-58-3-8/19

On Determining Thermal Coefficients by Means of the Method of Linear Instantaneous Source.

figure and 3 Russian references.

ASSOCIATION: Academy of Sciences USSR, Institute of Physics of the Earth (Akademiya nauk SSSR, Institut Fiziki Zemli)

SUBMITTED: November 26, 1956.

AVAILABLE: Library of Congress.

Card 2/2

AUTHOR: Chetayev, D. N. SOV/49-59-1-8/23

TITLE: The Inverse Problem in the Theory of Electrical Prospecting of Non-conducting Seams which Emerge on the Surface (Obratnaya zadacha teorii elektrorazvedki neprovodyashchikh plastov, vykhodyashchikh na poverkhnost')

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, 1959, Nr 1, pp 73-82 (USSR)

ABSTRACT: The author applied Tumashev and Nuzhin's method of solution of the inverse boundary problem in aerodynamics (Refs 3,4) to two-dimensional inverse problems in the theory of electrical prospecting. He discussed the effect of the surface topography on the flow of uniform direct electric current (Ref 1) and on determination of the position and polarisation of an ore deposit which was represented by a linear dipole (Ref 2). The present paper extends the work reported in Refs (1) and (2) to electrical prospecting in the case of non-conducting seams which emerge on the surface and which lie parallel to topographic horizontals. The problem can be stated as follows: to find, from the values of electric current

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SOV/49-59-1-8/23

The Inverse Problem in the Theory of Electrical Prospecting of Non-conducting Seams which Emerge on the Surface

measured along an uneven surface, the position of a perturbing body on the assumption that it is a thin non-conducting seam, which emerges on the surface and which lies in a uniform medium. The author shows that there is only one solution of this problem, i.e. only one distribution of electric potential along the surface satisfies a given set of actual surface conditions. . Consequently, electrical prospecting methods which use direct current may be applied to find more exactly the position of seams discovered by drilling. Analytical interpretation of the results of measurements of the electric current makes it possible to discover when this method is applied incorrectly. If wrong assumptions are made, the calculated surface topography does not agree with the actual topography and the mistake becomes obvious.

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SOV/49-59-1-8/23

The Inverse Problem in the Theory of Electrical Prospecting of Non-conducting Seams which Emerge on the Surface

There are 12 references, 8 of which are Soviet, 2 Japanese, 1 Italian and 1 French.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki Zemli (Ac. Sc., USSR, Institute of Earth Physics)

SUBMITTED: December 3, 1957

Card 3/3

CHETAYEV, D.N.

Effect of the elasticity of the medium on the radiation resistance of a piston in a screen. Akust.zhur. 5 no.4:501-503 '59. (MIRA 14:6)

1. Institut fiziki zemli imeni O.Yu.Shmidta, Moskva. (Sound)

S/049/59/000/12/018/027
E032/E391

AUTHOR: Chetayev, D.N.

TITLE: On Solving the Inverse Problem in the Theory of Electromagnetic Sounding

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1959, Nr 12, pp 1864 - 1866 (USSR)

ABSTRACT: The algorithm of the analytical interpretation of the data of electromagnetic sounding in the case of the disturbances of the field caused by a vertical magnetic dipole is described. The direct problem is considered for a cylindrical symmetrical field with the components E_θ, B_r and B_z calculated from the Maxwell formula (1) as Eqs (11), (12) and (13), respectively. The latter equation can be written as Eq (19) for $z = 0$. The inverse problem is considered for a given component $B_z(r,0)$ (Eq (19)). Thus, the function (21) is obtained for the boundary conditions, Eq (22), which can be utilised in Eq (23) to define the conductivity as a

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E032/E391

On Solving the Inverse Problem in the Theory of Electromagnetic Sounding

function of $\sigma(z)$, the final form of which is given as Eq (42).

There are 2 references, 1 of which is Soviet and 1 German.

ASSOCIATION: Akademiya nauk SSSR Institut fiziki Zemli (Institute of Physics of the Earth, Ac.Sc.USSR)

SUBMITTED: June 20, 1959

Card 2/2

S/049/60/000/004/013/018
E032/E314

AUTHOR: Chetayev, D.N.

TITLE: Determination of the Coefficient of Anisotropy and the Dip Angle of a Uniform Anisotropic Medium From the Measured Impedance of the Natural Electromagnetic Field

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, Mo. 4, pp 617 - 619

TEXT: Consider the half-space $z' > 0$ (Fig. 1) filled with a uniform anisotropic conducting medium having an angle of dip α. Let the resistivity in the direction of the x, y and z axes be ρ_t (longitudinal resistivity) and ρ_n (transverse resistivity). It is assumed that the natural electromagnetic field can be represented in the form of a plane wave incident normally on the half-space. Resolving this wave into two components polarized in mutually perpendicular directions, one can consider separately the waves in which the electric field lies along the x and y' axes. When the electric field lies along the x axis, the wave will be propagated in an effectively isotropic medium having a resistivity ρ_t. The problem therefore reduces to the consideration of the case where the

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

S/049/60/000/004/013/018
E032/E314

Determination of the Coefficient of Anisotropy and the Dip Angle of a Uniform Anisotropic Medium

electric field is in the perpendicular direction. In this case the field inside the conducting anisotropic half-space will only have the components B_x, E_y abd E_z. The Maxwell equations in the x, y, z system attached to the principal axes of anisotropy are then given by Eq. (1), where the resistivity is anisotropic but the dielectric constant and the magnetic permeability are isotropic. It is assumed that the dielectric constant is zero, and the displacement currents can be neglected in comparison with conduction currents, then the volume density of charge $q = 0$. The Maxwell equations will then simplify into the form given by Eq. (3). If the displacements current are neglected not only in the conducting medium but also (at sufficiently low frequency) in air also, then the problem consists in the solution of the field equations in the conducting half-space only. The boundary conditions are such that the field must vanish for z' tending to infinity and the normal component of the current density must also be zero on the surface $z' = 0$. It is shown that the solution for B_x is of the

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E032/E314

Determination of the Coefficient of Anisotropy and the Dip Angle of a Uniform Anisotropic Medium

form of the plane wave given by Eq. (6). In fact, Eq. (6) satisfies Eq. (5) with the wave number given by Eq. (7). The y and z components of the current density are given by Eq. (8) and it follows from the boundary conditions that i'_z vanishes identically. Thus the condition on the surfaces is automatically satisfied and Eq. (6) is the solution. The electric field is then given by Eq. (10). Finally, the impedance is given by Eq. (13). Measurement of this impedance, with the electric field in the two perpendicular directions as mentioned above, will thus yield the coefficient on anisotropy and the dip angle. There are 1 figure and 6 references: 5 Soviet and 1 English.

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ASSOCIATION: Akademiya nauk SSSR Institut fiziki Zemli (AS SSSR Institute of Physics of the Earth)

SUBMITTED: July 29, 1959

Card 3/3

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

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42213
S/057/62/032/011/005/014
B104/B102

AUTHOR: Chetayev, D. N.

TITLE: The field of a low frequency electric dipole situated on the surface of a homogeneous anisotropic conducting semi-space

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 11, 1962, 1342-1348

TEXT: An electric dipole of moment $\dot{I}l \exp(i\omega t)$ lies horizontally on the interface z = 0 between a nonmagnetic conducting medium and air. The conductivity tensor satisfies $\sigma_{xx} = \sigma_{yy} = \sigma_t$, $\sigma_{zz} = \sigma_n$; and ω is so small that the displacement current can be neglected both in the conducting medium and in the air. As in a paper of V. A. Fok (ZhRFKhO, ch. fiz., 58, 356, 1926; Ann. d. Phys., 17, 401, 1933) the problem is solved by the help of a vector potential $\vec{A}(A_x, 0, A_z)$; div $\vec{A} = -\mu\sigma_t\dot{\Phi}$. The system

$$\frac{\partial^2 A_x}{\partial x^2}+\frac{\partial^2 A_x}{\partial y^2}+\frac{\partial^2 A_x}{\partial z^2}-i\omega\mu\sigma_t A_x=0, \qquad (5)$$

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$$\frac{\partial^2 A_z}{\partial x^2}+\frac{\partial^2 A_z}{\partial y^2}+\frac{\sigma_n}{\sigma_t}\frac{\partial^2 A_z}{\partial z^2}-i\omega\mu\sigma_n A_z=\left(1-\frac{\sigma_n}{\sigma_t}\right)\frac{\partial^2 A_x}{\partial x\partial z}. \qquad (6)$$

is set up and a solution is sought in the form

$$A_x=\int_0^\infty J_0(\lambda r)X(z,\lambda)\,d\lambda, \qquad (8)$$

$$A_z=\frac{\partial}{\partial x}\int_0^\infty J_0(\lambda r)Z(z,\lambda)\,d\lambda. \qquad (9),$$

in cylindrical coordinates whose z-axis passes through the dipole. With the solution stated in this form, determination of the vector potential is reduced to the problem of finding the independent functions X and Z. For an anisotropic semispace the formulas:

$$X=\frac{\mu Il}{2\pi}\frac{\lambda}{\lambda+\sqrt{\lambda^2+k^2}}e^{-z\sqrt{\lambda^2+k^2}} \qquad (15) \text{ and}$$

The field of a low frequency ... S/057/62/032/011/005/014
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$$Z=\frac{\mu Il}{2\pi\lambda}\left(\frac{\sqrt{\lambda^2+k^2}}{\lambda+\sqrt{\lambda^2+k^2}}e^{-z\sqrt{\lambda^2+k^2}}-e^{-z\sqrt{\frac{\lambda^2\sigma_1}{\sigma_0}+k^2}}\right). \qquad (16)$$

are obtained whereby the solution of the problem is reduced to quadratures. With the help of the expressions

$$A_z=\frac{\mu Il}{2\pi k^2}\left(\frac{\partial^2 S}{\partial z^2}-k^2\frac{\partial F}{\partial z}+\frac{\partial^3 F}{\partial z^3}\right). \qquad (19),$$

$$A_x=A_{x1}+A_{x2}=-\frac{\mu Il}{2\pi k^2}\frac{\partial}{\partial x}\left(\frac{\partial S}{\partial z}+\frac{\partial^2 F}{\partial z^2}\right)+\frac{\mu Il}{2\pi}\frac{xz}{r^2}(S-\bar{S}). \qquad (22)$$ and

$$\Phi=\frac{Il}{2\pi\sigma_1}\left[\frac{\partial^2 F}{\partial x\partial z}-\frac{x}{r^2}\left(S+z\frac{\partial S}{\partial z}-\bar{S}-z\frac{\partial \bar{S}}{\partial z}\right)\right]. \qquad (23)$$

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for the potentials in which the Sommerfeld and Fok integrals

$$S=\int_0^\infty J_0(\lambda r)\,e^{-z\sqrt{\lambda^2+k^2}}\,\frac{\lambda d\lambda}{\sqrt{\lambda^2+k^2}}=\frac{e^{-kR}}{R}\quad(R=\sqrt{r^2+z^2}),\qquad(17)\ \text{and}$$

$$F=\int_0^\infty J_0(\lambda r)\,e^{-z\sqrt{\lambda^2+k^2}}\,\frac{d\lambda}{\sqrt{\lambda^2+k^2}}=I_0\left[\frac{k}{2}(R-z)\right]K_0\left[\frac{k}{2}(R+z)\right]\qquad(18)$$

as well as

$$S=\frac{e^{-k\sqrt{\frac{r^2\sigma_n}{\sigma_t}+z^2}}}{\sqrt{\frac{r^2\sigma_n}{\sigma_t}+z^2}},\qquad(21)$$

are introduced, the electromagnetic field is obtained by $\vec{B}=\operatorname{curl}\vec{A}$, The field of a low frequency ...

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$\vec{E} = -i\omega\vec{A} - \mathrm{grad}\,\Phi$ with the help of the tabulated functions. For the purpose of geophysical investigations, formulas

$$B_z = \frac{3\mu I l y}{2\pi k^2 r^5}\left[1 - e^{-kr}\left(1 + kr + \frac{k^2 r^2}{3}\right)\right]$$

and

$$-E_x = \frac{Il}{2\pi\sigma_t r^3}\left\{\left[\left(\frac{3x^2}{r^2} - 2\right) + e^{-kr}(1 + kr)\right] + \right.$$

$$\left. + \left[\left(1 - \frac{3x^2}{r^2} - \frac{kx^2}{r}\right)e^{-kr} - \left(\sqrt{\frac{\sigma_t}{\sigma_n}} - \frac{3x^2}{r^2}\sqrt{\frac{\sigma_t}{\sigma_n}} - \frac{kx^2}{r}\right)e^{-kr\sqrt{\frac{\sigma_n}{\sigma_t}}}\right]\right\}.$$

$$E_y = \frac{3Ilxy}{2\pi\sigma_t r^3}\left\{1 + \left[\left(\sqrt{\frac{\sigma_t}{\sigma_n}} + \frac{kr}{3}\right)e^{-kr\sqrt{\frac{\sigma_n}{\sigma_t}}} - \left(1 + \frac{kr}{3}\right)e^{-kr}\right]\right\}.$$

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are derived, giving the surface values of the components B_z, E_x, and E_y: The first term in these formulas corresponds to an isotropic medium with conductivity σ_t, and the second term is the correction for the anisotropy.

SUBMITTED: July 17, 1961

CHETAYEV, D.N.

New method for solving the principal problem of the theory of dipole electromagnetic soundings. Geol.i geofiz. no.2:118-122 '62. (MIRA 15:4)

1. Magnitnaya laboratoriya AN SSSR, Moskva.
(Electromagnetic prospecting)

CHETAYEV, D.N.

Field of a low-frequency electric dipole situated on the surface of a uniform anisotropic conducting half-space. Zhur. tekh. fiz. 32 no.11:1342-1348 N '62. (MIRA 15:11)

(Dipole moments)

24,2120

S/109/63/008/001/009/025
D266/D308

AUTHOR: Chetayev, D. N.

TITLE: A method for solving the axially symmetric problems of the electrodynamics of gyrotropic media

PERIODICAL: Radiotekhnika i elektronika, v. 8, no. 1, 1963, 64-72

TEXT: Assuming exp $i\omega t$ time variation and eliminating the scalar potential by the generalized Lorentz condition

$$\varphi = -\frac{c}{i\omega}\operatorname{div}(\varepsilon\vec{A})$$

where

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radiation patterns do not belong to this class the first problem is to approximate the given radiation pattern by functions from W_σ. This is done by finding an approximating polynomial and multiplying it by a suitably chosen auxiliary function. The author calls attention to the fact that only the absolute value of the radiation pattern is specified and one is free to choose the phase distribution. It is investigated whether the number of terms in the Fourier expansion (which always contains a finite number of terms) can be reduced or the convergence improved by a judicious choice of the phase distribution. The answer to both questions was found to be negative. However, by changing the phase of the radiation pattern the relative complexity of the phase and amplitude distribution functions changes as well. It is suggested that the phase of the radiation pattern be chosen in such a way as to make the amplitude distribution function easily realizable. The mathematical condition for the existence of a number of phase radiation patterns requires that the approximating polynomial must have complex roots. As an example the synthesis of a cosecant radiation pattern is

$$\varphi = - \frac{c}{i\omega\varepsilon} \left(i\varepsilon_a k_o^2 Ⓗ + \frac{\partial A_z}{\partial z} \right) \tag{17}$$

where ε_a is the off-diagonal element of the permittivity tensor and $A_o = - \partial Ⓗ / \partial r$. Separating the variables in Ⓗ and in A_z, the partial differential equations are reduced to ordinary differential equations with constant coefficients which can be easily solved. In problems concerned with waveguides filled with a gyrotropic medium a combination of these solutions must be sought which will satisfy the boundary conditions. The application of the method is illustrated in an example where exact integral representations are obtained for the potential of the electromagnetic field of a vertical electric and magnetic dipole located over the plane surface of vertically polarized plasma.

SUBMITTED: March 5, 1962

Card 3/3

CHETAYEV, D. N.

Method for solving axisymmetrical problems of the electrodynamics of a gyrotropic medium. Radiotekh. i elektron. 8 no.1:64-72 Ja '63. (MIRA 16:1)

(Electrodynamics) (Plasma(Ionized gases))

L 13043-63 EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(w)-2 AFFTC/ASD/ESD-3/
AFWL/SSD Pz-4/Pab-4/Pi-4/Po-4 AT/IJP(C)

ACCESSION NR: AP3001339 S/0057/63/033/006/0754/0757

AUTHOR: Chetayev, D. N. 79

TITLE: On a dipole above a gyrotropic medium

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 33, no. 6, 1963, 754-757

TOPIC TAGS: electromagnetic fields, gyromagnetic media, plasma

ABSTRACT: The electromagnetic field of a vertically directed dipole (electric or magnetic) in vacuo above the infinite plane horizontal boundary of a homogeneous medium, characterized by a constant Hermitian dielectric tensor in which the two horizontal diagonal components are equal and the mixed horizontal-vertical components vanish, is calculated. The result is applicable to a gyromagnetic medium and, when space dispersion may be neglected, to a uniform plasma. The calculations are performed by solving Maxwell's equations for the complex potentials by a separation of variables which leads to a solution in the form of a Fourier-Bessel integral involving the Bessel function of zero order. Orig. art. has: 39 formulas.

ASSOCIATION: none

Card 1/2

L 32004-66 EWT(l) IJP(c)

ACC NR: AP6013164 (N) SOURCE CODE: UR/0387/66/000/004/0045/0051

AUTHOR: Chetayev, D. N.

ORG: Institute of Physics of the Earth, Academy of Sciences, SSSR (Institut fiziki zemli, Akademiya nauk SSSR)

TITLE: A new method for the solution of electrodynamic problems in anisotropic media

SOURCE: AN SSSR. Izvestiya. Fizika Zemli, no. 4, 1966, 45-51

TOPIC TAGS: anisotropic medium, gyrotropic medium

ABSTRACT: Plane, homogeneous, anisotropic layers of two-axial type were investigated by reducing the Maxwell equations to an ordinary differential equation. It was shown that the method can be successfully applied to the solution of analogous problems in the gyrotropic media. By expressing a tensor of conductivity of an anisotropic medium in matrix form, and taking into consideration the generalized Lorentz conditions, a nonhomogeneous differential equation with constant coefficients was obtained. Where the anisotropic medium fills in the half-space ($z>0$), the equation

Card 1/2 UDC: 550.837.6

L 32004-66

ACC NR: AP6013164

will give the generalized solution after the application of the Laplace transformation. Orig. art. has: 31 formulas.

SUB CODE: 08,20/ SUBM DATE: 26May65/ ORIG REF: 012/ OTH REF: 000

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

ACC NR: AP7006058 SOURCE CODE: UR/0387/66/000/010/0048/0061

AUTHOR: Chetayev, D. N.

ORG: Institute of Physics of the Earth, AN SSSR (Institut fiziki zemli AN SSSR)

TITLE: Electromagnetic potentials in layered-anisotropic media

SOURCE: AN SSSR. Izvestiya. Fiziki zemli, no. 10, 1966, 48-61

TOPIC TAGS: electrodynamics, Lorentz transformation, partial derivative, anisotropic medium

SUB CODE: 20,12

ABSTRACT: This paper gives a method for solution of electrodynamic problems for layered-anisotropic media using normalization relations generalizing the Lorentz condition. It is shown that the earlier used normalization relations derived by A. N. Tikhonov and the author are in a definite sense the optimal generalized Lorentz conditions and are equivalent from the point of view of the possibilities of field determination. For both optimal conditions the author has derived general representations of the components of the vector potentials, coinciding with an accuracy to the gradient transformation. In both cases the components of the potentials are expressed through four solutions of two homogeneous equations in second-order partial derivatives; two solutions are related by a first-order differential relation. The method is applicable to the solution of the new problem of the low-frequency dipole at the surface of a half-space, filled with a homogeneous sloping-layered anisotropic medium. This problem corresponds to a model of medium used

Card 1/2

0927086 2

ACC NR: AP7006058

for interpretation purposes in electrical prospecting of slanting homogeneous anisotropic deposits. Orig. art. has: 80 formulas. [JPRS: 39,180]

Card 2/2

UDC: 550.837.6

CHETAYEV, N.G. Deceased Born - Dec 6, 1902
Died - Oct 17, 1959

Mechanics See ILC

CHETAYEV, Nikolay Gur'yevich; ROZAL'SKAYA, N.I., red.

[Stability of motion] Ustoichivost' dvizheniia. izd.3. Moskva, Nauka, 1965. 207 p. (MIRA 18:12)

ARBUZOV, A.Ye., akad.; VAVILOV, S.I., akad.; VOL'FKOVICH, S.I., akad.; KOCHINA, P.Ya., akad.; LANDSBERG, G.S., akad.; LEYBENZON, L.S., akad.; PORAY-KOSHITS, A.Ye., akad.; SMIRNOV, V.I., akad.; FESENKOV, V.G., akad.; CHERNYAYEV, V.I., akad.; KAPUSTINSKIY, A.F.; KORSHAK, V.V.; KRAVKOV, S.V.; NIKIFOROV, P.M.; PETROV, A.D.; PREDVODITELEV, A.S.; FRISH, S.E.; CHETAYEV, N.G.; CHMUTOV, V.K.; SHOSTAKOVSKIY, M.F.; KUZNETSOV, I.V., red.; MIKULINSKIY, S.R., red.; MURASHOVA, N.Ya., tekhn.red.

[Men of Russian science; essays on prominent persons in natural science and technology: Mathematics, mechanics, astronomy, physics, chemistry] Liudi russkoi nauki; ocherki o vydaiushchikhsia deiateliakh estestvoznaniia i tekhniki: matematika, mekhanika, astronomiia, fizika, khimiia. Moskva, Gos. izd-vo fiziko-matem. lit-ry, 1961. 599 p. (MIRA 14:10)

1. Chleny-korrespondenty AN SSSR (for Kapustinskiy, Korshak, Kravkov, Nikiforov, Petrov, Predvoditelev, Frish, Chetayev, Chmutov, Shostakovskiy).
(Scientists)

CHETAYEV, P. M.

32360

MRAZOVSKIY, S. S. I CHETAYEV, P. M. Novyy variant Kapillyarnogo Myetoda Dlya Izmyeryeniya Malykh Izmyenyeniy Povyerkhnostvogo Natyazhyeniya i Yego Primyenyeniye. Kolloipnyy Zhurnal, 1949, Vyp. 5, s. 359-62

SO: Letopis' Zhurnal'nykh Statey, Vol. 44

CHETAYEV, P. M.

23015 Ob anomaliyakh v temperaturnoy zavisimosti poverkhnostnogo natyazheniya. Trudy. Khar'k. Khim. - Tekhnol. In-ta Im. Kirava. vyp. 7, 1949, C. 17-21

SO: LETOPIS' NO. 31, 1949

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

CHETAYEV, P. M.

A

A new modification of the capillary method of measuring small differences in surface tension and its application. S. S. Urazovskii and P. M. Chetaev. *Kolloid. Zhur.* 11, 359-63(1949); cf. *C.A.* 43, 7[illegible].—A capillary of radius 0.06 mm. was partly immersed in a wide vessel, and the vessel lifted or lowered by a micrometer screw so that the meniscus in the capillary had a const. position when liquids or temps. were varied. The capillary rise thus could be measured within ±0.01%. The surface tension γ of H_2O at 20-80° calcd. from this rise differed from the literature data by not more than 0.03 dyne/cm. Monochloroacetic acid showed 3 kinks in the γ-temp. curve at 61.3, 56.2, and 50.2°, i.e. at the m.ps. of its 3 modifications.

J. J. Bikerman

CHETAYEV, P.M.

25

B

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

A New Effect in Temperature Dependence of Surface Tension. (In Russian.) S. S. Urazovskii and P. M. Chetaev. *Zhurnal Fizicheskoi Khimii* (Journal of Physical Chemistry), v. 23, Dec. 1940, p. 1421-1425.

Above effect consists of the existence of inflection points on the $\gamma(t)$ curve corresponding to the melting point of the monotropic-polymorphic modification. A theoretical interpretation of this new effect is presented in the light of the modern theory of the liquid state and the theory of molecular polymorphy. Practical importance is emphasized.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

CHETAYEV, P. M.

USSR/Physics - Temperature
Physics - Optics Jul 49

"Characteristics of Temperature Dependence of the Refractive Index of Light in Fluids," S. S. Urazovskiy, P. M. Chetayev, Khar'kov Chemicotechnol Inst imeni S. M. Kirov, 2½ pp

"Dok Ak Nauk SSSR" Vol LXVII, No 2

Measurements of the temperature dependence of the refractive index of light in many substances showed clear deviations from the linear path of this dependence, expressed by definite breaks corresponding to points of molecular, polymorphic conversion. Data given is considered sufficient proof of the presence of such conversion if liquid phases. Submitted by Acad P. A. Rebinder 23 Apr 49.

PA 54/49T110

CHETAYEV, P. M.

PA 197T26

USSR/Chemistry - Phase Conversions Dec 51

"Characteristics of the Temperature Dependence of Certain Thermodynamic Functions of Surface Layers of Liquids," P. M. Chetayev, Khar'kov

"Zhur Fiz Khim" Vol XXV, No 12, pp 1455-1459

On basis of temp dependence of surface tension of benzene, calcd thermodynamic functions of its surface layer (concn of total surface energy, surface entropy, and sp heat cond of surface). Found that dependence of functions on temp makes

LC 197T26

USSR/Chemistry - Phase Conversions (Contd) Dec 51

possible to establish connection between structural conversions of vol phases at phase conversion points of a liquid and processes of change of analogous structures occurring in surface layers.

LC 197T26

CHETAYEVA, V.G.

So-called self-recovery of bone cysts resulting from pathological fractures. Ortop. travm. i protez. 21 no. 9:30-33 S '60.
(MIRA 13:12)

1. Iz Ukrainskogo nauchno-issledovatel'skogo instituta ortopedii i travmatologii imeni M.I. Sitenko (dir. - chlen-korrespondent AMN SSSR prof. N.P. Novachenko).
(FRACTURES) (BONES--DISEASES)

MATSKEVICH, N.D.; CHETAYEVA, V.G.

Treatment of a congenital dislocation of the hip in newborn infants. Trudy Ukr. nauch. - issl. inst. ortop. i travm. no.15:95-100 '59 (MIRA 16:12)

1. Iz Ukrainskogo nauchno-issledovatel'skogo instituta ortopedii i travmatologii imeni prof. M.I.Sitenko (dir. - chlen-korrespondent AMN SSSR prof. N.P.Novachenk).

CHETCHUYEV, G. A.

33125

Mekhanicheskiye Kharakteristiki Maslyanykh Vyklyuchateley Tipa Mkp-35 Vestnik Elektroprom-sti, 1949, No 10, c. 11-13

SO: Letopis' Zhurnal'nykh Statey, Vol. 45, Moskva, 1949

CHETCHUYEV, G. A.

58/49T45

USSR/Electricity — Jun 49

Circuit Breakers
Electrical Equipment

"Type MKP-35 High-Speed Substation Oil Breaker," G. A. Chetchuyev, Engr, Uralelektroapparat Plant, 5 pp

"Vest Elektro-Prom" Vol XX, No 6

Gives operating data for new type MKP-35 breaker: rated voltage 20 - 35, rated current 600 - 1,000 amps, interrupting capacity 430,000 - 750,000 kva, speed 0.08 sec, current-interrupting capacity 12,500 amps, 1-sec

[redacted] 58/49T45

USSR/Electricity (Contd) — Jun 49

current capacity 17,300 amps. Details construction. Small dimensions and weight of breaker, together with a suspension-type operating mechanism, considerably simplify the foundation required.

[redacted] 58/49T45

PA 153T21

CHETCHUYEV, G. A.

USSR/Engineering - Circuit Breakers
Electric Power

Oct 49

"Mechanical Properties of Type MKP-35 Oil Breakers," G. A. Chetchuyev, Engr, "Uralelektroapparat" Plant, 2 pp

"Vest Elektro-Prom" Vol XX, No 10

Subject breakers previously described [see FDD Per Abs 58/49T45]. Present article gives their characteristics, as obtained from type tests, which will enable users to check the breakers on reassembly after repairs, etc. Includes six graphs.

153T21

[redacted]

The Ural Electrical Machine-building Plant 479

COVERAGE: The book contains a brief history of the construction and development of the Ural Electrical Machine-building Plant and a detailed description of the progress achieved in designing and building various kinds of machinery including water-wheel generators, a-c and d-c electrical machines, transformers, high-voltage equipment, mercury-arc rectifiers and machines for the electrification of the national economy. Plans for the future development of the plant and of the production of the electrical industry in general are also discussed. The book is the seventh issued in the series "Iz istorii mashinostroyeniya na Urale" (History of Machine-building in the Urals) which will contain a total of ten books. No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

Card 2/3

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

The Ural Electrical Machine-building Plant 479

AVAILABLE: Library of Congress

JJP/ksv
8-5-58

Card 3/3

L 09266-67 EWT(m) PDN/DJ

ACC NR: AP6029884 (A) SOURCE CODE: UR/0413/66/000/015/0046/0047

36

INVENTORS: Chetchuyev, G. A.; Poletavkin, Yu. P.

ORG: none

TITLE: Arc quenching device for an oil tank switch. Class 21, No. 184310

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 46-47

TOPIC TAGS: electric switch, ~~arc suppression~~ electric arc

ABSTRACT: This Author Certificate presents an arc quenching device for an oil tank switch with multiple contact breaking, an arc quenching network displaced relative to the cylinder axis, a movable contact bridge, and a piston attachment. To increase the reliability of operation, the contact rods are connected with the contact bridge by ball-and-socket joints (see Fig. 1). Disconnecting springs are located between the contact rods. The piston attachment is built in along the cylinder axis and controls a regulated support mounted at the center of the contact bridge. Hinged covers on the exhaust slots are provided with hydraulic dampers.

Card 1/2 UDC: 621.316.542.064.25.027.3

L 09266-67

ACC NR: AP6029884

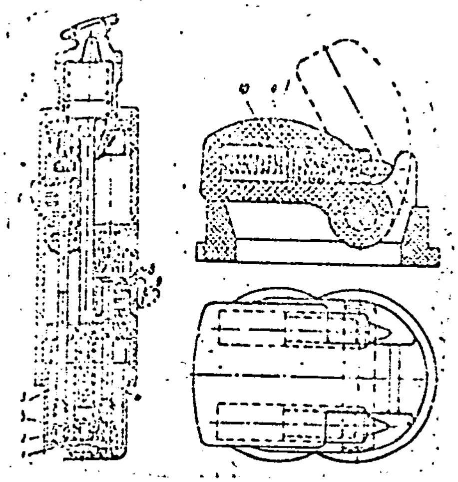

Fig. 1. 1 - contact bridge; 2 - ball-and-socket joint; 3 - contact rods; 4 - disconnecting spring; 5 - regulated support; 6 - piston attachement rod; 7 - piston attachment; 8 - arc quenching network; 9 - hinged cover; 10 - hydraulic damper

Orig. art. has: 1 diagram.

SUB CODE: 09, 13/ SUBM DATE: 04May64

CHETCHUYEVA, T.A. (Leningrad)

Retroperitoneal pseudomyxoma of the appendix [with summary in English]. Arkh.pat. 19 no.5:64-66 '57. (MLRA 10:8)

1. Iz kafedry patologicheskoy anatomii (zav. - prof. M.A.Zakhar'yevskaya) I Leningradskogo meditsinskogo instituta imeni akad. I.P. Pavlova

(APPENDIX, neoplasms
pseudomyxoma, retroperitoneal)
(ADENOCARCINOMA, case reports
retroperitoneal pseudomyxoma of appendix)

MITROFANOVA, Ye.I.; CHETCHUYEVA, T.A.

Generalized lymphogranulomatosis with stenosis of the larynx.
Vest.otorin. 20 no.2:122-123 Mr-Ap '58. (MIRA 12:11)

1. Iz kafedry bolezney ukha, gorla i nosa (zav. - prof.V.F.
Undrits) i kafedry patologicheskoy anatomii (zav. - prof.
M.A.Zakhar'yevskaya) I Leningradskogo meditsinskogo instituta.
(HODGKIN'S DISEASE, compl.
laryngeal stenosis (Rus))
(LARYNX, stenosis
in Hodgkin's dis. (Rus))

BABCHINA, I.P.; CHETCHUYEVA, T.A.

Metastases from cancer of the jejunum into the brain and spinal cord simulating tabes dorsalis. Sbor. trud. Len. nauch. ob-va nevr. i psikh. no.6:56-63 '59. (MIRA 13:12)

1. Iz kafedry nervnykh bolezney (zav. - prof. D.K. Bogorodinskiy) i kafedry patologicheskoy anatomii (zav. - prof. M.A. Zakhar'yevskaya) 1-go Leningradskogo meditsinskogo institut imeni akademika I.P. Pavlova.

(JEJUNUM—CANCER) (BRAIN—CANCER)
(SPINAL CORD—CANCER)

CHETCHUYEVA, T.A. (Leningrad, 2, Zagorodnyy prosp., 13, kv.34)

Age-connected changes in the venous valves of the lower extremities. Arkh. anat. gist.i embr. 38 no.1:63-74 Ja '60. (MIRA 13:7)

1. Kafedra patologicheskoy anatomii (zav. - prof. M.A.Zakhar'yevskaya) I Leningradskogo meditsinskogo instituta im. akad. I.P.Pavlova.
(EXTREMITIES, LOWER--BLOOD SUPPLY) (VEINS)

CHETIRKIN N.R.

USSR/Miscellaneous - Theses

Card 1/1 : Pub. 128 - 29/31

Authors : ...

Title : Author's references on theses

Periodical : Vest. mash. 10, 110-111, Oct 54

Abstract : The following technical theses were submitted for evaluation: 1) "Investigation of the Electrical Treatment of Stainless Steel Propellers", by N. R. Chetirkin; 2) "The Influence of Certain Elements of a Reversible~~-blade Turbine~~ on Its Cavitational Characteristics", by I. N. Filatov; and 3) "The Effect of the Rigidity of the S-I-D System on Vibrations during Machining", by N. G. Latyshev.

Institution : ...

Submitted : ...

. ALANIYA, O. M. BLOKH, Ya. L. BLOKH, A. M. CHETIYA, L. I. DORMAN
. S. KAMINER, T. V. KEBULADZE, V. K. KOYAVA, Ye. V. KOLOMEYETS, V. O. KORIDZE,
. . PIVEREVA, M. I. TYASTO

Cosmic Ray Effects During Magnetic Storms

Report submitted for the 8th Intl. Conf. on Cosmic Rays (IUPAP), Jaipur India,
2-14 Dec 1963

Chetka, W.

Technical progress in the 5-Year Plan of the fancy-goods industry. P. 77
ODZIEZ. (Centraine Zarzady Przemyslu Dziewiarskiego, Odziezowego i Ponczoszniczego) Lodz.
Vol. 7, no. 3, Mar. 1956

SOURCE: EEAL LC Vol. 5, no. 7, July 1956

CHETKA, W,

CHETKA, W. The production of galalith buttons; experiences from Czechoslovakia. p. 215. Vol. 7, no. 8, Aug. 1956. ODZIEZ. Lodz, Poland.

SOURCE: East Europeans Accessions List (EEAL) Vol. 6, No. 4--April 1957

CHETKA, W.

CHETKA, W. The production of galalith buttons; experiences from Czechoslovakia. (Conclusion) p. 276. Vol. 7, no. 10, Oct. 1956. ODZIEZ, Lodz, Poland.

SOURCE: East European Accessions List (EEAL) Vol. 6, No. 4--April 1957

CHETKAROV, M.

Popov, V., Chetkarov, M., "The Specific Resistance and Piercing Potential of Mica Board from Bulgarian Mica." p.53 (GODISHNIK, MATEMATIKA I FIZIKA, Vol. 47, No. 1, 1950/51-1951/52, Sofiya.)

SO: Monthly List of East European Accessions, Vol. 3, No. 3, Library of Congress, March, 1954, Uncl.

CHETKAROV, M.

3

621.314.26 :621.314.224

1401. Frequency multiplication by saturable current transformers at [illegible] c/s. E. Iznakov and M. Chetkarov, Izv.Bulg.Akad.Nauk, 2, 147-68 (1951)

Experimental investigations on frequency multiplication by saturable transformers [illegible]

is given. The inputs of the frequency multipliers tested [illegible] between [illegible] and 600 W. The transformer sheets [illegible] .35 mm thick and had 4% Si content. The [illegible] were obtainable [illegible] mainly on flux density Bm, premagnetizing field strength H and [illegible] [illegible] with other parameters, which enter the theoretical equations on which the design is based. These parameters, however, do not depend on size and shape of the transformer sheets but on their materials. The [illegible] of such frequency multipliers was [illegible] only in the [illegible] frequency [illegible] which have to be tuned; higher harmonics may be produced only with a bad utilization factor as well as with poor efficiency.

Electrical Engineering Abst.
Vol. [illegible] No. 676
Apr. 1954
Electrical Engineering

CHETKAROV, M. ; STOIANOV, G.

Electric conductivity of selenium with an admixture of iodine. p. 251.

GODISHNIK. MATERMATIKA I FIZIKA. Sofiia, Bulgaria, Vol. 50, No. 1 1955/56 (Published 1957)

Monthly List of East Accession (EEAI) LC, Vol. 9, No. 1 January 1960

Uncl.

CHETKAROV, M.

Electric conductivity, dielectric losses and disruptive field of the multilayer mica insulators. p. 261.

GODISHNIK. MATEMATIKA I FIZIKA. Sofiia, Bulgaria, Vol. 50, No. 1 1955/56 (Published 1957)

Monthly List of East Accession (EEAI) LC, Vol. 9 No. 1 January 1960

Uncl.

AUTHOR: Chetkarov, M. L. 57-28-5-7/36

TITLE: Concerning the Modification of the Ionization Energy in Impurity Semiconductors (Otnositel'no izmeneniya ionizatsionnoy energii v primesnykh poluprovodnikakh)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 5, pp. 962--964 (USSR)

ABSTRACT: It is known, that the ionization energy for the unlimited dilution of the impurity centers in semiconductors can be expressed by the formula by Rydberg: $W_0 = \frac{m^* e^4}{2\varepsilon^2\hbar^2}$. It was found, that the ionization energy decreases with an increase of the concentration of impurity centers (Refs 1-3). In the present paper a new explanation of these effects is given on the basis of the theory of thermo-electrons as proposed by Frenkel' (Ref 6). Here, a semiconductor was investigated, which exhibited impurity centers of the donor - and acceptor type evenly distributed with the concentration N. It was assumed, that these impurity centers possess identical ionization energy W and are distributed in such a way, that they form a lattice with the constant $N^{-1/3}$ in the respective medium with a dielectric constant ε. $N^{-1/3}$ denotes the mean distance between any two cen-

Card 1/3

ters A and B (figure 1). r and $(N^{-1/3}-r)$ denotes the distance of an electron -(or hole, respectively)- from A and any other center B $(y=z=0; |x|=r)$. Using these denotations the electron energy with respect to A can be represented as

$U(r) = -\frac{e^2}{\varepsilon}\left(\frac{1}{r} + \frac{1}{N^{-1/3}-r}\right)$. It possesses a maximum $\Delta W_N = 4e^2N^{1/3}/\varepsilon$ at $r_m = N^{-1/3}/2$. Therefore the ionization energy of the impurity centers at this concentration will be $W = W_0 - \frac{4e^2N^{1/3}}{\varepsilon}$.

If an homogenuous field E is acting upon a valence electron (hole), the respective potential energy of the electron with respect to A will equal -eEr , hence we can rewrite (2) as follows: $U(r) = -\frac{e^2}{\varepsilon}\left(\frac{1}{r} + \frac{1}{N^{-1/3}-r}\right) - eEr$

This formula possesses a maximum at the electric field strength: $E = \frac{e}{\varepsilon}\left[\frac{1}{r_m^2} + \frac{1}{(N^{-1/3}-r_m)^2}\right]$ and has a real meaning, if $r_m \leqslant N^{-1/3}/2$. If the field is weak, $E \approx 0$, that is to $r_m \simeq N^{-1/3}/2$

Concerning the Modification of the Ionization Energy in Impurity Semiconductors 57-28-5-7/36

In this case for the electric conductivity the formula is obtained: $\sigma = A \exp\left(-\frac{W_0 - 4e^2 N^{1/3}/\varepsilon}{2kT}\right)$. If the field is strong, $r_m \ll N^{-1/3}$. The ionization energy in this case is given by: $\sigma = A \exp\left(-\frac{W_0 - 2\sqrt{e^3 E/\varepsilon}}{2kT}\right)$. The ionization energy of the impurity centers according to their concentration can be determined from formula (6) or more exactly from $n = \sigma/ue$ by measurements of the conductivity or of the Hall constant. Formula (8) represents the law by Frenkel'. It is assumed in the here given conclusions, that the ionization energy remains constant and that the dielectric constant does not vary with the concentration N of the impurity centers. There are 2 figures and 8 references, 4 of which are Soviet.

ASSOCIATION: Sofiyskiy fizicheskiy institut, Bolgariya (Sofia Physics Institute, Bulgaria)

SUBMITTED: July 22, 1957

1. Crystal structure--Analysis 2. Semiconductors--Electrical properties

Card 3/3

S/058/61/000/012/038/083
A058/A101

AUTHOR: Chetkarov, M. L.

TITLE: Concerning photoelectret theory

PERIODICAL: Referativnyy zhurnal, Fizika, no. 12, 1961, 326, abstract 12E195 ("Izv. Fiz. in-t s ANYeB", 1960, no. 8, 33-51, Bulg., Russ., Engl. summary)

TEXT: The theory of polarization and kinetics of electric processes in photoelectrets has been developed. It is assumed that part of the electrons generated in conduction bands gradually fall into traps on the surface of dielectrics, owing to which there arise a double electric layer and photoelectret polarization. Photoelectret-polarization emf is calculated. The nascent photoelectret polarization gradually decreases the voltage acting on the photoelectret, and causes a decrease in density of the photopolarization current and reverse-photodepolarization current J. If a photoelectret formed at a certain temperature is heated, part of the current carriers localized in its surface traps recombine with the centers which created them with the result that photoelectret-polarization emf decreases. It is shown that J and its initial value decrease

Card 1/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

Concerning photoelectret theory

S/058/61/000/012/038/083
A058/A101

incident to heating. It was established that j does not depend on temperature or on heat treatment. These inferences were found to be in good agreement with experimental data. There are 22 references.

V. Lyubimov

[Abstracter's note: Complete translation]

24,2600

S/058/62/000/003/069/092
A061/A101

AUTHOR: Chetkarov, M. L.

TITLE: The effect of temperature on photoelectret state

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1962, 23, abstract 3E185 ("Dokl. Bolg. AN", 1960, v. 13, no. 5, 515 - 518, English; Russian summary)

TEXT: The approximate temperature dependences obtained for the emf of polarization and photodepolarization current are in fairly good agreement with experimental data on the photoelectret from rhombohedral S (Nazhdakov, G., and Kashukeyev, N. "Izv. B"lg. AN. Otd. fiz.-matem. i tekhn. n. Ser. fiz.", 1952, v. 3, 103). The formula presented for the drop of the emf of polarization in the dark agrees with the drop curve observed in the paper (RZhFiz, 1957, no. 8, 20293).

V. Makedonskiy

[Abstracter's note: Complete translation]

Card 1/1

CHETKAROV, M.L.

Kinetics of the e.m.f. of high-voltage polarization in dielectrics. Fiz. tver. tela 3 no.8:2193-2196 Ag '61. (MIRA 14:8)

1. Sofiyskiy universitet, Bolgariya.
(Polarization (Electricity))
(Electromotive force)
(Dielectrics)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

27271

S/181/61/003/008/001/034
B102/B201

24.3600

AUTHOR: Chetkarov, M. L.

TITLE: Theory of photoelectrets

PERIODICAL: Fizika tverdogo tela, v.3, no.8, 1961, 2197 - 2201

TEXT: The photoelectret state has been experimentally observed on sulfur crystals as well as on other dielectric materials and semiconductors. Not all the rules governing this phenomenon, however, have yet been clarified theoretically. The author presents new theoretical data based on the results of his previous investigation (FTT, III, no.8, p.2193). It is assumed that during the illumination of a photosensitive dielectric or of a semiconductor plate of thickness d and with dielectric constant $\varepsilon = \varepsilon_0 \varepsilon_r$ a part of the electrons excited in the conduction band drops, under the action of voltage U, into surface traps with the energy level W_s. This leads 1) to an increase of induced electric charge on the condenser plates above the amount of electricity proportional to their

4

Card 1/4

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000308720020-9"

27271

Theory of photoelectrets S/181/61/003/008/001/034 B102/B201

size, and 2) to the appearance of volume charge and of a double layer with the maximum thickness Δd which is determined by the total number of traps that can be filled. This thickness corresponds to the polarization capacity $\Delta C = \varepsilon S/\Delta d$, where S denotes the illuminated area of the electrode. The specific conductivity of the material changes, due to absorption of photons, by $\Delta\sigma = \sigma - \sigma_d$, where σ denotes the specific conductivity under illumination, and σ_d is the dark conductivity under otherwise equal conditions. Under certain conditions $\sigma \gg \sigma_d$, so that $\Delta\sigma \approx \sigma$. In addition, $\sigma \approx \Delta\sigma = aI$, where I denotes the illumination intensity in w/cm^2, and resistance $R = d/\sigma S$. Using the results of the previous investigation, $P(t) = U(1-\Theta)\left\{1-\exp\left[-\Theta(1-\Theta)\frac{aI}{\varepsilon}t\right]\right\}$ is obtained for the emf of photoelectret polarization, and $j_1(t) = aI_1E\left\{\Theta+(1-\Theta)\exp\left[.....\right]\right\}$ for the density of the photopolarization current, where I_1 denotes the illumination intensity in case of polarization. When $t = 0$ and $t = \infty$, then $j_1(0) = aI_1E$ and

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$j_1(\infty) = aI_1E\Theta$, wherefrom a and Θ can be determined. For sulfur single crystals, Θ ranges between 0.5 and 0.7. Similar relations may also be considered to exist for photo-depolarization. If the photoelectret is formed at temperature T_0, the amount of electricity absorbed in ΔC will be proportional to the number N of traps filled at this temperature. Then, after a temperature increase to T, N_1 electrons of a total of N trapped electrons will pass over into the conduction band and recombine. $N_2 = N-N_1$ electrons remain in the traps. $N_1 = A(T)\exp(-W_s/kT)$. Since $N_1 = 0$ for T_0, $A(T_0) = 0$; at melting temperature T_m, $A(T_m) = C(T_m-T_0)$. The following holds for the electrons remaining in the traps:

$N_2/N = 1 - N_1/N = 1 - \frac{T-T_o}{T_m-T_o} \exp \frac{W_s}{k} \frac{T_m-T}{T_mT} = 1 - \alpha$, which is equal to the ratio of the emf of the photoelectret polarization for T and T_0. Thus,

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$P(t_1,T) = (1-\alpha)P(t_1,T_0)$; $j_2(0,T) = (1-\alpha)j_2(0,T_0)$ and $\Delta j_2 = j_2(0,T_0)-j_2(0,T) = \alpha j_2(0,T_0)$ are found for the photo-depolarization current density. For $T \equiv T_0$, $\alpha = 0$ and $j_1(0,T_0) \equiv j_1(0,T) = aI_1E$. If a dielectric is photopolarized during the time t_1 and is kept for some time in the dark at the same or a higher temperature, the residual polarization of this photoelectret will drop exponentially with time. The results for rhombic sulfur single crystals ($W_s = 0.386$ev) are in good agreement with experimental data. G. Nadzhakov and V. M. Fridkin are mentioned. There are 4 figures and 14 references: 10 Soviet-bloc and 4 non-Soviet-bloc. The two references to English-language publications read as follows: H. Kallman, B. Rosenberg. Phys. Rev.97, 1956, 1955; B. Kurrelmeyer. Phys. Rev.30, 893, 1927;

ASSOCIATION: Sofiyskiy universitet Bolgariya (Sofia University, Bulgaria)

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S/503/61/009/001/001/007
B125/B102

AUTHOR: Chetkarov, M. L.

TITLE: On the kinetics of the electromotive force of high-voltage polarization in dielectrics

SOURCE: Bulgarska akademiya na naukite. Fizicheski institut. Izvestiya na Fizicheskiya institut s ANEB. v. 9, no. 1, 1961, 5-24

TEXT: An analytical formula for the high-voltage polarization is deduced, and is used as a basis for explaining the various effects of the electrical conductivity in dielectric crystals. There are three possible ways in which a polarization capacity can arise: (1) the electrically positive traps in the surface layer gradually fill up when a voltage U is applied to the n-type dielectric. This gives rise to a polarization double layer with the additional capacity $\Delta C = n_S e^2 S/2(W-\xi)$, where n_S is the concentration of these traps, e is the elementary charge, S is the surface area of the electrode, and $(W-\xi)$ is the energy level of the trap. The

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stationary value of the electromotive force of high-voltage polarization increases with increasing concentration of the traps. The outcome of the experiments performed by A. F. Ioffe, K. D. Sinelnikov, and V.M.Gokhberg (ZhRFKhO, 58, 105, 1926), and the diffusion of impurity atoms from the cathode into the layer of the crystal near the electrode, can be explained in this way. (2) The additional capacity for a dielectric with the conductivity $\sigma_p = e\mu_p p$ and with electrically negative traps on its surface is given by $\Delta C = n'_S e^2 S/2(W' - \zeta')$. p and μ_p denote the concentration and the mobility of the holes, n'_S is the concentration of the traps on the surface, $(W' - \zeta')$ is the energy level of this trap. In the case of mixed n and p-type conductivities, the polarization capacity is

$$\Delta C = \frac{n_S n'_S e^2 S}{2(n_S W' + n'_S W) - W_0(n_S + n'_S)}, \qquad (18),$$

where W_0 is the width of the forbidden band. When an electric field $E < E_c$

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is applied the electromotive force of the high-voltage polarization is

$$P(t) = \frac{q'}{\Delta C} = U(1-\theta)\left(1 - e^{-\theta(1-\theta)\frac{\sigma}{\epsilon}t}\right). \qquad (28),$$

the current in the forward direction is

$$j_1(t) = \sigma E\left[\theta + (1-\theta)e^{-\theta(1-\theta)\frac{\sigma}{\epsilon}t}\right], \qquad (30),$$

and the current in the backward direction is

$$j_2(t') = -\sigma E(1-\theta)\left(1 - e^{-\theta(1-\theta)\frac{\sigma}{\epsilon}t_1}\right)e^{-\theta(1-\theta)\frac{\sigma}{\epsilon}t'} \qquad (34).$$

In such a case, $\theta = C_0/\Delta C = \Delta d/d$, where d is the thickness of the double layer, E_c is the critical polarizing field, For $E > E_c$ and $U > U_c$ the formulas

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$$P(t) = U_\kappa (1-\theta)\left(1 - e^{-\theta(1-\theta)\frac{\sigma}{\varepsilon}t}\right) = P_{max}\left(1 - e^{-\theta(1-\theta)\frac{\sigma}{\varepsilon}t}\right), \tag{44}$$

$$i_1(t) = \sigma\left[E - E_\kappa(1-\theta)\left(1 - e^{-\theta(1-\theta)\frac{\sigma}{\varepsilon}t}\right)\right], \tag{45}$$

$$i_2(t') = -\sigma E_\kappa (1-\theta)\left(1 - e^{-\theta(1-\theta)\frac{\sigma}{\varepsilon}t_1}\right) e^{-\theta(1-\theta)\frac{\sigma}{\varepsilon}t'}, \tag{46}$$

are valid in the place of (28), (30), and (34). The dielectric loss angle

$$\operatorname{tg}\delta = \frac{1}{\omega RC_0}\,\frac{1}{\frac{1}{(1-\theta)^2} + \frac{\theta}{\omega^2 R^2 C_0^2}}, \tag{72}$$

has its maximum at the frequency

$$\omega_n = \frac{1}{RC_0}\sqrt{\frac{\theta(1-\theta)^2}{\frac{2\theta(1-\theta)^2}{R^2 C_0^2} - 1}}, \tag{73}$$

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when $2\theta(1-\theta)^2 > (RC_o)^2$. There are 9 figures.

ASSOCIATION: Fiziko-matematicheski fakultet pri Sofiyskiya d"rzhaven universitet (Division of Physics and Mathematics at the Sofia State University)

SUBMITTED: October 14, 1960

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B108/B102

AUTHOR: Chetkarov, M. L.

TITLE: Superposition of high-voltage polarization e. m. f. in dielectrics

PERIODICAL: Fizika tverdogo tela, v. 4, no. 8, 1962, 2279 - 2280

TEXT: In an earlier paper (FTT, 3, 2193, 1961) the variation with time of the high-voltage polarization e. m. f., P(t), was established:

$$P(t) = U(1 - \vartheta)\cdot(1 - \exp(-\vartheta(1-\vartheta)\sigma t/\varepsilon)).$$

For this it was assumed that the polar capacity $\Delta C = \varepsilon S/\Delta d$ be gradually charged through the intrinsic resistance $R = d/\sigma S$. $\vartheta = C_0/\Delta C = \Delta d/d$ is the ratio of the geometric capacity $C_0 = \varepsilon S/d$ of a capacitor to its polar capacity. The above relation is now generalized to the case of repeated jumps of applied voltage U and electrical conductivity σ. This is done by using the law of undisturbed superposition of voltages. A jump at time t_1 will mean an increase in voltage from U to $U_1 = U + \Delta U_1$. With reference

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to the current density, also the electric field strength will increase from E to $E_1 = E + \Delta E_1$. In the case of a jump in conductivity, the same holds true for σ. If several jumps in U and σ occur, the above formula will contain sums of the type $U + \Delta U_1 + \Delta U_2 + \dots$, and the time t in the exponential function will have to be replaced by the sum $t_1 + t_2 + \dots$ of the times at which a jump occurs.

ASSOCIATION: Sofiyskiy universitet, Bolgariya (Sofiya University, Bulgaria)

SUBMITTED: March 6, 1962

CHETKAROV, M.

Consecutive superposition of the electromotive force of high-voltage polarization in rhombic sulfur. Doklady BAN 16 no.5: 481-484 '63.

1. Predstavleno chl. korr. E. Dzhakovym.

CHETKAROV, M.; ROUSSEVA, V. [Ruseva, V.]

Photoelectret polarization in monocrystals of $CuSO_4.5H_2O$ in UV light. Doklady BAN 17 no.2:109-112 '64.

1. Submitted by Academician G.Nadjakov [Nadzhakov, G.], Member of the Board of Editors, "Doklady Bolgarskoy akademii nauk".

SOV/109-3-7-17/23

AUTHORS: Kislov, V. Ya., Sviridov, V. T., Chetkin, M. V.

TITLE: A Non-Slowed Wave in the System Consisting of a Coaxial Helix and a Centre Conductor (Nezamedlennaya volna v sisteme koaksial'no raspolozhennykh spirali i tsentral'nogo provodnika)

PERIODICAL: Radiotekhnika i elektronika, 1958, Vol 3, Nr 7, pp 964-966 (USSR)

ABSTRACT: The radius of the helix is a and its winding angle is ϕ. The radius of the centre conductor is c. It is assumed that the helix satisfies the usual boundary conditions, while the boundary conditions for the centre conductor are expressed by Eqs.(2) and (3), where μ_1 is the permeability of the centre rod, σ is its conductivity and ω is the angular frequency. By employing the above boundary conditions the dispersion equation of the system is in the form of Eq.(4), where $I_0, \ldots, K_1$ are the modified Bessel functions; k is the wave number, β is the propagation constant, and ε and μ are the permittivity and permeability of free space. If $\gamma a \ll 1$ and $\gamma c \ll 1$, Eq.(4) can be written as Eq.(5), which can further be simplified and written as Eq.(6). If the solution of Eq.(6) is in the form of Eq.(7), the perturbation χ is

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expressed by Eq.(9). From Eq.(9) it is seen that ctg ϕ should be greater than 1, which is normally fulfilled in a practical helix. From this it is concluded that in the helix-centre conductor system it is possible to obtain non-slowed waves having a low attenuation; this results in the appearance of a parasitic feedback between the input and the output of the tube. The paper contains 4 Soviet references.

SUBMITTED: January 17, 1958.

1. Electromagnetic waves--Mathematical analysis

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